

15¢

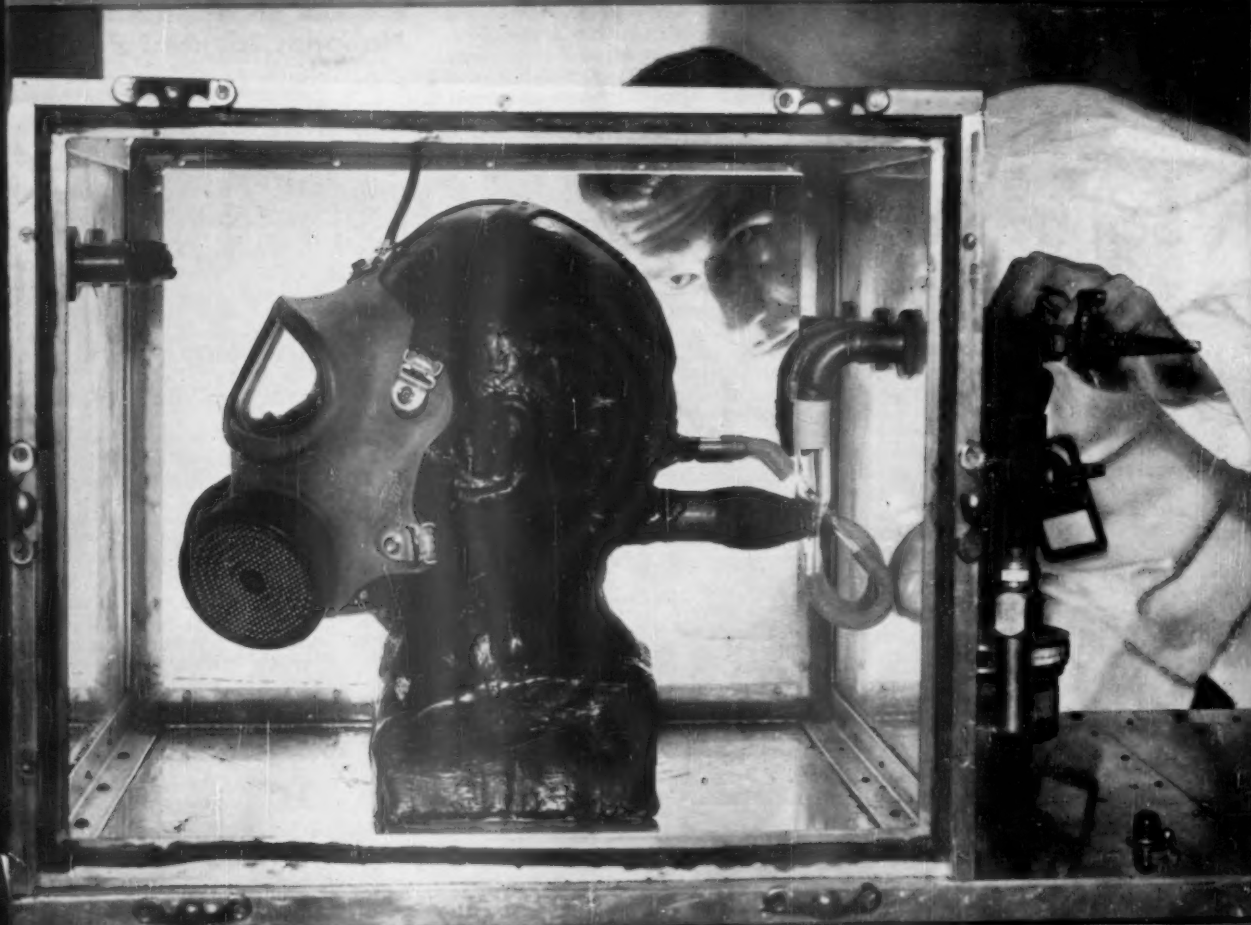
\$5.50 A YEAR

January 14, 1956

VOL. 49, NO. 2 PAGES 17-32

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



"Hot" Head

See Page 24

A SCIENCE SERVICE PUBLICATION

ASTROPHYSICS

Expanding Universe Shown

► **NEW EVIDENCE** of the expansion of the universe is given by radio microwaves measured here on earth after arrival from the tremendous collision of two vast stellar systems like our own Milky Way.

With the 50-foot radio telescope atop the Naval Research Laboratory, Anacostia, D.C., two scientists, Dr. A. Edward Lilley and Edward F. McClain, tuned in on the radio noise of the sky's second "brightest" source of radio waves, called Cygnus A.

They found that the frequency of these 21-centimeter waves is shifted toward the red end of the spectrum by what is considered the recession or rushing away of the gigantic galaxies. This corresponds to the red shift or Doppler effect discovered in light from the same galaxies.

Both light and radio are caused by the energy of collision of the hydrogen gas

molecules in the clashing stellar systems.

The galaxies are rushing away with the expansion of the universe, which is greater the farther away from us. At the Cygnus A distance of a hundred million light years (light traveling in a year at 186,000 miles per second) the velocity of recession is approximately 10,500 miles per second for both radio and light waves. This is presumably an actual flying apart of the universe. The optical velocity was determined at Palomar Observatory after the location of the radio "star" had been obtained by British and Australian radio astronomers.

The correspondence of both the light and radio effects make scientists more confident they are dealing with expansion effects and not some change in fundamental laws with distance.

Science News Letter, January 14, 1956

GENERAL SCIENCE

Science Understanding

► **COUNTERATTACKING** antagonism that has arisen toward science and engineering and the claims of humanists that they are narrowly materialistic and destructive of human values, President James R. Killian, Jr. of the Massachusetts Institute of Technology, in the Sigma Xi address before the American Association for the Advancement of Science meeting in Atlanta, called upon non-scientists to understand the meaning, the method and the spirit of science.

Poets, historians and men of affairs are proud that they do not learn anything about science, Dr. Killian charged. As a result the world has a philosophy that is

quite anachronistic and inadequate to our times, he observed.

In a faculty meeting of a liberal arts college, Dr. Killian reported, everybody laughed when a student named Cicero was reported as having flunked Latin, but when a student named Gauss was named as having failed mathematics, only the science professors laughed.

Dr. Killian said that there is too much protesting that only in the liberal arts can the true gospel of man be found and that there is a tendency to make the scientist the scapegoat for the ills of the modern world.

Science News Letter, January 14, 1956

PHYSICS

Probe Atomic Hearts

► **MANY** new inhabitants of atomic hearts will be discovered before scientists reach an understanding of the mysterious forces that keep nuclei from flying apart.

Physicists have just begun to recognize some familiar faces in the crowd of tiny particles packed in the nuclear core, but about as fast as older ones are recognized, new ones are discovered.

This game of hide and seek will probably continue for some time, scientists attending the American Physical Society meeting at the University of Southern California, Los Angeles, agreed.

In their search for new particles, giant atom smashers and the faint tracks that cosmic rays leave on photographic emulsions are the two most powerful tools. This field, known as high-energy nuclear physics,

is the very forefront of physics today.

A "mopping-up" operation, where all needed information is available yet scientists still do not understand what is going on, is also being conducted at many laboratories throughout the country investigating the phenomenon of superconductivity, first discovered by K. Onnes in 1911.

Such familiar metals as lead and tin, when cooled to temperatures within a few degrees of absolute zero, 459.7 degrees below zero Fahrenheit, exhibit strange and mysterious properties.

An electric current once started in a lead circular wire at these low temperatures will continue to flow indefinitely without loss of amount, as far as can be told.

At room temperatures, current in the same wire would "ooze away" within a

fraction of a second, Dr. R. P. Feynman of California Institute of Technology reported.

Man's brains are the most important tool in tackling superconductivity, he said. He likened the subject to a besieged city far behind the front lines.

The laws governing the behavior of materials are well understood until the jump to superconductivity is taken at a very low, but definite temperature.

Then suddenly, scientists are faced with mysterious reactions, not involving new particles, but only the "familiar" electrons. Yet, after 40 years of research, superconductivity still remains to be explained.

Science News Letter, January 14, 1956

GENERAL SCIENCE

AMA to Participate in National Science Fair

► **THE AMERICAN** Medical Association will present a special citation and an invitation to exhibit at its annual meeting to the boy or girl exhibiting the best display on medical research, general health, or physical fitness, at the Seventh National Science Fair, next May 10-12, in Oklahoma City.

This action, announced by Dr. Alphonse McMahon, St. Louis, chairman of the AMA's Council on Scientific Assembly, will mark the first time the AMA has actively participated in the National Science Fair, sponsored by Science Clubs of America, a Science Service activity.

In making the announcement, Dr. McMahon said:

"The advancement of medical science depends on our developing and encouraging medical talent among high school students. We appreciate this opportunity to stimulate young scientists and to let them know that medicine is worthy of their talents.

"Our invitation to the winning student to be an AMA guest at our annual meeting in Chicago next June 11-15 will permit his work to be included among over 300 other medical exhibits, prepared and staffed by some of the world's most eminent physicians. His display will be part of the official Scientific Exhibit in Navy Pier where more than 20,000 physicians will gather during the five-day meeting."

The AMA will assume the expenses of the winner's Chicago visit, and is presently encouraging its constituent state and county medical societies to undertake sponsorship of local and regional high school science club fairs from which finalists may be sent to the National Science Fair in Oklahoma City.

The AMA award, a feature of its career guidance program, is in addition to about 50 other National Science Fair Awards, which total about \$2,000 in scientific apparatus and material.

Approximately a hundred local and area science fairs are expected to send about 190 young scientists to the Seventh National Science Fair in Oklahoma City.

Science News Letter, January 14, 1956

GENERAL SCIENCE

Science, Mankind's Servant

Not a mysterious and magical super-creed, declares Dr. Warren Weaver in retiring presidential address of AAAS, which gave 11 characteristics of science.

► SCIENCE is not a mysterious and magical super-creed, but is instead the servant of mankind and the friendly companion of art and moral philosophy, Dr. Warren Weaver, Rockefeller Foundation vice-president for natural and medical sciences, reassured the American Association for the Advancement of Science at Atlanta in his address as retiring president.

Dr. Weaver presented 11 general characteristics of science, which may be briefly summarized as follows:

1. Science has impressively proved itself to be a powerful way of dealing with certain aspects of our experience. These are, in general, the logical and quantitative aspects, the method working superbly for linear and stable physical problems in two or three variables. The physical universe seems to be put together in such a way that this scientific approach is exceedingly successful in producing a good, workable, initial description.

2. We simply do not know yet how far these methods, which have worked so well with physical nature, will be successful in the world of living things. The successes to date are most impressive. One feature after another which previously seemed to fall in a special "vital" category has usefully yielded to biochemical or biophysical attack. But it is also the case that we have as yet made only a beginning. How far the logical-quantitative method will succeed here, one would be rash to forecast, although the prospects do indeed seem most promising.

3. We have made small beginnings at extending the scientific method into the social sciences. Insofar as these fields can be dealt with in terms of measurable quantities, they seem to present closely intercoupled situations, which can very seldom usefully be handled with two or three variables, and which often requires a whole hatful. Science has, as yet, no really good way of coping with these multivariable, but nonstatistical, problems, although it is possible that ultra-high-speed computers will inspire new sorts of mathematical procedures which will be successful in these cases where the effects are too numerous to handle easily, and not numerous enough or of suitable character to permit statistical treatment.

4. It is, incidentally, not at all necessary that the particular analytical techniques of the physical sciences be forced upon biological or social problems with the arrogant assumption that they can and should make unnecessary other types of insight and experience. During the recent war a most useful collaboration was developed, known often as operations analysis, in which reason-

ing of a mathematical type was applied to certain aspects of very complicated situations, but with no expectation that judgment, experience, intuition, or a vague sort of general wisdom would be displaced or superseded—rather only that these be aided by whatever partial light could be furnished by quantitative analysis.

5. An important characteristic of science is its incapacity to be impractical. The most far-reaching discoveries and the most widespread useful applications regularly flow out of ideas which initially seem abstract and even esoteric. These ideas arise out of the unguided and free activity of men who are motivated by curiosity or who, even more generally, are thinking about scientific problems simply because they like to. This way in which apparently aimless curiosity stubbornly refuses to be foolish and leads to important goals, doubtless seems strange or even incredible to some persons. This eventual usefulness of the initially impractical is widely held to be a very special feature of science, but I am not so sure of this. I think that impracticality is more generally important than we are inclined to suppose.

6. Science presents the kind of challenge that attracts to it young men and women who tend to have a rather high degree of a certain kind of intelligence. Since this particular kind of intelligence is relatively easy to recognize and measure, and since many other types are subtle and illusive, even though perhaps more important, we tend to adopt this one type as the norm. Also, this particular type of intelligence leads rather promptly to tangible results. These circumstances lead to the conclusion, which is then something of a tautology, that scientists are more intelligent than other people. This may or may not be so. More important: it may be neither true nor untrue, in the sense that the attempted comparison is meaningless.

7. In spite, however, of their appearing to be so bright, scientists are not special creatures: they are people. Like lots of other people they are good at their own tasks. Off their jobs they seem, as Shylock remarked in another connection, "to be fed with the same food, hurt with the same weapons, subject to the same diseases, healed by the same means, warmed and cooled by the same winter and summer" as other men are. When you prick them, they do indeed bleed.

8. One rather accidental fact has led many to think that scientists are strange and special. This is the fact that scientists often use a strange and special language. Science does find it desirable to use very many



NEW A.A.S. PRESIDENT—Dr. Laurence H. Snyder, dean of the University of Oklahoma graduate college, Norman, Okla., was elected president of the American Association for the Advancement of Science at its Atlanta meeting. A geneticist and specialist in heredity, Dean Snyder will preside over the A.A.S. in 1957 and deliver the principal address at the 1958 meeting.

technical words, and it has indeed developed, as a matter of saving time, a sort of language of its own. This gives to science an external appearance of incomprehensibility which is very unfortunate. The public need not think itself stupid for failing intuitively to grasp all this technicality. Indeed what has developed is not so much a language as a series of very specialized dialects, each really understood only by its inventors.

9. Science does not deserve the reputation it has so widely gained of being based on absolute fact (whatever that is supposed to mean), of being wholly objective, of being infinitely precise, of being unchangeably permanent, of being philosophically inescapable and unchallengeable. There seem still to be persons who think that science deals with certainty, whereas it is of course the case that it deals with probabilities.

10. The development of Western science, rather than constituting a uniquely inevitable pattern, has been influenced by the general nature of Graeco-Judaic culture, including specially the standards, arising within that tradition, of what is interesting and important.

11. Science is a very human enterprise, colored by our general ideas, changeable as any human activity must be, various in its possible forms, and a common part of the lives of all men. The impressive methods which science has developed, methods

which sometimes seem so formidable, are in no sense superhuman. They involve only improvement, great, to be sure, of pro-

cedures of observation and analysis, which the human race has always used.

Science News Letter, January 14, 1956

MEDICINE

Cold Vaccine Tests

Navy recruits are receiving shots against one kind of infectious cold. Already found successful in tests on prisoner volunteers. Many colds now plaguing us may be this type.

► TESTS of a new vaccine against one kind of infectious cold, maybe the kind that is plaguing many of us now, have started in a small group of Navy recruits at Great Lakes, Ill., Naval Training Station. They will be started in a second small group next month.

The tests are being made by the Naval Medical Research Unit No. 4 at Great Lakes, a Navy spokesman said.

The vaccine being tested is for the APC viruses. These viruses were isolated by Drs. R. J. Huebner, J. A. Bell and Victor Haas of the National Institutes of Health, Public Health Service. The NIH scientists made a vaccine against them and with Dr. T. G. Ward of Johns Hopkins School of Hygiene, Baltimore, tested the vaccine on prisoner volunteers. These tests on a small group showed the vaccine to be safe and effective.

The tests now under way among Navy recruits are still considered preliminary. Only a couple of hundred recruits are getting the vaccine. These small scale trials were set up to see how the vaccine works in a military establishment and to determine proper dosage. If the vaccine suc-

ceeds in safely protecting the couple of hundred recruits from APC infection, it is expected to get large scale trial among thousands of recruits.

APC viruses cause a special kind of cold, or upper respiratory disease to use the technically correct term. This is not the sneezing, runny nose type of cold. It is one in which its victims have sore throat and some fever. In summer outbreaks, the disease is less severe than in winter. Red eyes are a symptom of the summer APC attack.

APC viruses are very common and come at all seasons. In schools, military training establishments, orphanages, and the like, the APC viruses cause outbreaks or epidemics. Last summer an outbreak in Canada was traced to swimming pools.

Many of the colds now plaguing the population are believed due to APC viruses, although they have been so recently identified that facilities are not yet in existence for testing and reporting all cases. The letters APC stand for Adenoid, Pharynx in the throat and Conjunctiva of the eyes where the viruses were found.

Science News Letter, January 14, 1956

DENTISTRY

Saliva vs. Tooth Decay

► REPULSIVE to many, the mucus in saliva nevertheless may have an important role in preventing tooth decay. This is shown in studies by Dr. C. E. Klapper and associates at the University of Alabama Medical Center, Birmingham, reported to the AAAS.

Most of the saliva in the mouth is produced by three pairs of glands. These are the submaxillary located below the angle of the lower jaw, the sublingual under the tongue, and the parotid glands in front of the ears, which are the ones that swell in mumps. Dr. Leon H. Schneyer of the university's dental school found.

Dr. Klapper put Syrian hamsters on a diet that is known to produce tooth decay in these animals. Then he tied off or removed all the saliva-producing glands in one group. Another had only the parotid glands tied off. A third had only the under-tongue glands removed. The fourth group had only the under-jaw glands removed.

The tooth decay scores after 70 days of the decay-producing diet were highest for the group with all saliva-producing glands removed, lowest for those with only the parotid glands removed. This showed the saliva produced by the parotid glands played little or no part in protecting against tooth decay. The other glands still in the mouth were keeping the decay down.

The under-tongue glands which produce the smallest amount of saliva, only five percent of the total, were more effective in protecting against tooth decay than the parotid glands which produce 25% of the total saliva.

The reason, Dr. Klapper reports, is in the difference in composition of the saliva produced by the different glands. The parotids produce exclusively a clear fluid type of saliva. The under-tongue glands produce only the mucus of saliva. The under-jaw glands produce some of each.

Science News Letter, January 14, 1956

RADIO

Saturday, Jan. 21, 1956, 2:05-2:15 p.m. EST
"Adventures in Science" with Watson Davis, Director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. T. Campbell Thompson, surgeon-in-chief, Hospital for Special Surgery, New York City, will discuss "They Walk Again."

Spraying while trees are dormant is the only cure for peach leaf curl.

Rheumatoid arthritis is a seasonal disease that is likely to begin or grow worse in the colder months.

SCIENCE NEWS LETTER

VOL. 69 JANUARY 14, 1956 NO. 2

The Weekly Summary of Current Science, published every Saturday, by SCIENCE SERVICE, Inc., 172 N. St., N. W., Washington 6, D. C., NOrth 7-2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Copyright, 1956, by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service. Science Service also publishes CHEMISTRY (monthly) and THINGS of Science (monthly).

Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C., under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 3440, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 263) authorized February 28, 1950. Established in mimeographed form March 19, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation, Advertising Representatives: Howland and Howland, Inc., 1 E. 54th St., New York 22, Eldorado 5-5666, and 435 N. Michigan Ave., Chicago 11, Superior 7-6048.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Kirtley F. Mather, Harvard University; Paul B. Sears, Yale University; Karl Lark-Harowitz, Purdue University. Nominated by the National Academy of Sciences: Edward U. Condon, Berkeley, Calif.; Harlow Shapley, Harvard College Observatory; George W. Corner, Carnegie Institution of Washington. Nominated by the National Research Council: Ross G. Harrison, Yale University; Leonard Carmichael, Smithsonian Institution; Jerome Hunsaker, Massachusetts Institute of Technology. Nominated by the Journalistic Profession: Neil H. Swanson, Ruxton, Md.; O. W. Riegel, Washington and Lee University; Michael A. Gorman, Flint Journal. Nominated by the Scripps Estate: Edward J. Meeman, Memphis Press-Scimitar; John T. O'Rourke, Washington Daily News; Charles E. Scripps, Cincinnati, Ohio.

Officers—President: Leonard Carmichael; Vice President and Chairman of Executive Committee: Charles E. Scripps; Treasurer: O. W. Riegel; Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Jane Stafford, Marjorie Van de Water, Ann Ewing, Marace Loftin, Howard Simons, Dorothy Schriver, Helen M. Davis. Science Clubs of America: Joseph H. Krous, Margaret E. Patterson. Photography: Fremont Davis. Production: Priscilla Howe, Marcia Nelson. Interlingua Division in New York: Alexander Gode, 80 E. 11th St., GRamercy 3-5410.

PHYSICS

How Constant Is Second?

The timekeeping of the atomic clocks will be checked for accuracy against astronomical clocks. Each type can now be measured with an accuracy of one part per 1,000,000,000.

► **WHETHER** astronomical clocks keep the same time as atomic clocks will be checked within five years, Dr. G. M. Clemence, director of the U. S. Naval Observatory's Nautical Almanac Office, predicted.

Each clock keeps time by an entirely different method. One depends on observations of the stars, the other on the millions of vibrations each atom of the element cesium makes every second.

This is the first time in history, Dr. Clemence said, that two basic timekeeping standards have been available for comparison. Each can be measured with an accuracy of one part per 1,000,000,000 or better. One result of such comparison could be an improved value for the speed of light, which is now known accurately only to one part in 10,000.

Another result might be the discovery that atomic time was continuously accelerated with respect to astronomical time.

Even if this did happen, Dr. Clemence said it would not necessarily refute Einstein's theory of relativity, fundamental to which is the belief that the velocity of light is constant.

It would, however, have "great and far-reaching" effects on basic physical theory and on astronomers' present ideas of the structure of the universe.

Dr. Clemence warned that widespread use of atomic time might lead to confusion. He suggested use of the term "essen" to designate the second as measured by atomic vibrations, keeping the commonly used word, second, to designate astronomical time.

Astronomers have recently changed the basis of measuring a second, Dr. Clemence pointed out. It no longer takes 86,400 seconds to make a mean solar day.

A second is now defined as a 31,556,925.975 part of the tropical year, which corresponds to the seasons, for 1900.0. This new measure of time is known as ephemeris time.

It was adopted because gradual increases in the precision of astronomical observations and improvements in man-made clocks have shown the earth's rotation rate, by which the old second was measured, varies.

This irregularity, therefore, makes the earth's rotation period unsuitable for use as a precise standard.

The new second is based on the period of the earth's revolution around the sun, and has been officially recognized by the International Astronomical Union and the International Committee on Weights and Measures.

Science News Letter, January 14, 1956



CAT EYE TUBE—This is the key tube for the U. S. Air Force's new supersensitive television system. The new TV is called the "Cat eye" because it is a thousand times as sensitive as the ordinary TV camera and enables pilots to "see in the dark."

This doubling of the cross-section means that matter is much less transparent to anti-protons than to protons, Dr. Segre said.

Other scientists participating in the anti-proton symposium were Drs. C. Weigand, O. Chamberlain and J. J. Murray, all of the University of California, and Dr. R. Serber of Columbia University.

If a star or system of stars made entirely of negative matter does exist, Dr. Segre said, and collided with ordinary stars, a "catastrophe of cosmic proportions" would be produced, with "fireworks the like of which have never been seen."

Science News Letter, January 14, 1956

PHYSICS

Anti-Neutron Sought

New particle of negative matter will have no charge but will be negative because its magnetic poles will be reversed. Will be produced when anti-proton crashes nucleus.

► **A SEARCH** for a new particle of negative matter, the anti-neutron, is being launched at the University of California.

The anti-neutron, like the neutron, has no charge. It would annihilate matter in a collision with an ordinary neutron, the particle that keeps atomic reactors going.

Since the anti-neutron has no charge, its negative properties result from reversal of the tiny particle's magnetic poles.

Techniques for producing and detecting the anti-neutron are known and it is only a question of time before it is discovered, Dr. Emilio Segre said.

Scientists attending the American Physical Society meeting at the University of Southern California in Los Angeles learned of the hunt for the new particle of anti-

matter at a symposium on the anti-proton, whose discovery was announced on Oct. 19.

To make an anti-neutron, scientists will hurl an anti-proton at an atomic heart, then watch for the tracks made by the anti-neutron when it annihilates matter.

Anti-protons are produced from energy at the rate of about one every 15 minutes in Berkeley's giant bevatron. They are negatively charged particles of the same mass as protons, and are found only in high energy nuclear collisions such as occur in powerful atom smashers and cosmic radiation.

One unexpected property of the anti-proton is its effective size, twice that of the ordinary proton. This size, known as the cross-section, was expected by most scientists to be equal.

PSYCHOLOGY

Locate Melody Center in Brain

► **THE PART** of the brain that lets you know whether the band is playing The Star Spangled Banner or America, the Beautiful may have been located. At least, such a melody distinguishing center has been located in cat brains, and presumably there is a counterpart in human brains.

In the cat brain, the melody center is an area less than one-tenth of an inch on the surface of the brain area which is called the auditory cortex. The auditory cortex is the part of the brain controlling hearing.

When the auditory cortex is completely removed, the cats can still hear sounds, but cannot distinguish between simple melodies. So long as the one-tenth inch bit of auditory cortex on each side is left, however, the cats can tell the difference between patterns of notes, or melodies.

The discovery was reported by William D. Neff, Irving T. Diamond and Jay Goldberg of the University of Chicago at the meeting of the American Association for the Advancement of Science in Atlanta.

Science News Letter, January 14, 1956

PHYSICS

Pinch Instead of Can

Look for way to control fusion of hydrogen bomb without need for container able to withstand extremely high temperatures.

► CONTROLLING the H-bomb's fusion reactions for peaceful purposes without the need of a container able to withstand the tremendously high temperatures required is the aim of studies described to the American Physical Society meeting in Los Angeles.

Since supplies of light elements that can be fused or joined together are almost limitless, compared with supplies of uranium and other fissionable materials, scientists in many laboratories in the United States, England, Europe and India are attacking the problem of taming fusion reactions.

To make light elements fuse, temperatures of many thousands of degrees are required. Such temperatures are found in the sun and other stars, and when uranium or plutonium are fissioned or split in an atomic bomb.

But generating the required heat in a controlled manner means having containers that will not melt or be affected otherwise.

A new approach, eliminating the container problem, is to use the so-called "pinch effect." J. A. R. Samson and Dr. R. E. Vollrath of the University of Southern California reported to physicists their experiments on using this effect to obtain high temperatures for fusion in a gas column that touches no walls.

Atomic Energy Commission scientists are believed to be working along similar lines, but their work is shrouded in secrecy.

The pinch effect is the name given to the contraction of an electric current due to its own magnetic field. This shrinking occurs in any liquid or gas carrying a current, such as the familiar neon tube, but is usually much too small to be noticed or measured.

When large enough currents are used, however, the current will pull itself into a thin thread, and can even cut itself off.

As the gas contracts, it shrinks from the walls, until the thinning column is its own container, completely out of contact with the sides.

Dr. Vollrath and Mr. Samson are experimenting with hydrogen gas under very low pressure. A single surge of electricity is sent through the gas contained in a doughnut-shaped tube to "excite" it or raise its temperature.

By examining light emitted by the excited hydrogen, they have detected the beginning of contraction or pinching. Exactly what temperatures are obtained is not yet known, since their experiments are still in the preliminary stages.

The pinch effect was first noted by E. Northrup in 1907, when he was studying conduction of electrical currents in liquid mercury. Its application to gaseous discharges is an entirely new viewpoint that may, it is hoped, one day lead to controlled power from fusion of light elements.

Science News Letter, January 14, 1956

VETERINARY MEDICINE

New Worm Medicine

► DOG OWNERS, poultrymen and hog raisers will welcome the announcement made to the American Association for the Advancement of Science meeting in Atlanta that a simple and safe way of removing worm parasites has been found after a search of many years.

The drug utilized is highly soluble piperazine citrate. It is simply added to the drinking water. It is a preventive as well as a treatment.

Drs. R. F. Shumard and D. F. Eveleth of the North Dakota Experiment Station, Fargo, found that the drug and other piperazine salts are not only extremely effective against large roundworms but are not toxic even when given in dosages 10 times those actually needed.

Money-saving use of the new anthelmintic in pets and domestic animals is expected. It can be applied to some of the parasites of sheep as well.

Fear that treating foods with atomic radiations to preserve them would cause them to become poisonous seems to be unfounded. Two chemists of the Army Medical Nutrition Laboratory, Denver, Merrill S. Read and Dr. Herman F. Kraybill, reported that various sorts of food heavily treated with gamma radiation did not impair the growth of test rats and also gave no toxic symptoms. Food sterilization, rivaling freezing, canning and drying, will provide a use for waste atomic power "debris" that give off powerful radiations. It was predicted that food sterilization by atomic radiation would be a multimillion dollar business in the near future.

Science News Letter, January 14, 1956

More than 40 nations are participating in the *International Geophysical Year* program (1957-58), described as the most extensive scientific effort ever made.

MEDICINE

Antibiotic Can Act as Deodorant

► AN ANTIBIOTIC, or mold remedy, that stops staphylococci germs can also stop under-arm odor, Drs. Walter B. Shelley and Milton M. Cahn of Philadelphia report to the *Journal of the American Medical Association* (Dec. 31).

The antibiotic is used in a cream and applied daily like other cream deodorants. Neomycin is the antibiotic tested by the Philadelphia doctors. It works because it stops germs which recently have been found to cause odor through their action on body sweat.

The Philadelphia doctors suggest the antibiotic deodorant for "those few" who cannot tolerate the standard aluminum salt deodorants which are usually "highly effective."

Science News Letter, January 14, 1956

AT YOUR FINGERTIPS — More than 800 Element Facts



The Elemental Sloyd-Rul now completely up to date. Symbol, weight, density, number, valences, color, M & BP in °C for 98 elements plus recent name changes. In tough-check cardboard stock. \$1. postpaid. Student rate: 12 or more, 75c ea.

The Sloyd-Rul Co., Canaan, N. Y.

URANIUM-TUNGSTEN-MERCURY ZIRCONIUM-ZINC

Prospecting Information! Latest News and Data on Equipment and Methods.

Ultra-Violet Products, Inc., Dept. M, San Gabriel, Calif. Please send me Prospecting Information, description of equipment available, and name of nearest dealer. Name _____ Address _____ City _____ State _____

IF YOU'RE PROSPECTING FOR ANYTHING, YOU NEED AN ULTRA-VIOLET MINERALIGHT



HERE'S WHY! The Mineralight shows traces of uranium not sufficient to excite other responses, and detects minerals which are often found with uranium ore. By itself or teamed with a Geiger or Scintillation Counter, Mineralight is a must.

SEE THE MINERALIGHT IN ACTION

Your MINERALIGHT dealer can demonstrate the various models for you and give you complete information on Geiger counters, scintillation counters, and other prospecting equipment, as well as the latest data on uranium prospecting. See him today or write for valuable bulletin — "Uranium Prospecting with Magic Mineralight".

ULTRA-VIOLET PRODUCTS, INC.

GEOPHYSICS

Turmoil in Earth

Interior is slowly turning over in giant blocks at rate of one mile in hundred thousand years. Caused by radioactive heating at great depths.

► THE EARTH'S interior is slowly churning over in giant blocks hundreds of thousands of miles in size, a scientist has suggested.

Dr. Roger Revelle, director of the Scripps Institution of Oceanography, La Jolla, Calif., likened the snail-paced over-turning to tar mixing in a barrel heated from below. The motion is "incredibly small," he told the American Physical Society meeting, about one mile in 100,000 years.

Radioactive heating at great depths is thought to cause rocks deep beneath the surface to flow upward in some places and downward in others, he said.

This internal heat is of "fundamental importance in shaping the earth's surface." Volcanoes, earthquakes, mountain ranges and deep-sea trenches all result from slow convulsions within the earth produced by the heat's escape.

The total amount of heat coming from the earth's interior is only about a ten-thousandth of that falling on the earth's surface from the sun.

A search is being made, Dr. Revelle said, to see if a pattern exists in the quantity of heat flowing outward from different areas.

One pattern may have been found near the Great Acapulco Trench off Central America, where the heat flow is very low. Yet 500 miles to the west, where there is a great ridge on the sea floor, the heat flow is twice the average value.

Cold rocks may be moving downward under the trench and warm rocks moving upward under the ridge, Dr. Revelle told the physicists, who met at the University of Southern California, Los Angeles, in connection with the 75th anniversary of the University's founding.

It is possible that, even though heat is being generated within the earth, the outer layers have cooled since the earth's formation, Dr. Revelle said.

In doing so, they have contracted or shrunk, something like the skin of an apple when it dries. On this theory, mountain ranges and deep trenches are wrinkles produced by shrinking.

The radioactive elements, uranium, thorium and their disintegration products, as well as an isotope of potassium, are the heat sources within the earth.

Under the continents, most of the heat is probably generated in the outer 20 miles of the earth's rocky crust, since rocks in this outer layer are relatively high in radioactivity.

Rock samples from oceanic islands and rocks dredged from the deep-sea floor are low in radioactivity. Recent measurements have shown that heat flow through the sea

bottom from the earth's interior is much higher than had once been thought.

The undersea floor radioactive materials are believed to be spread out over a much greater depth than those under continents because the measured amounts of radioactivity per unit volume in rocks collected from oceanic areas are quite small.

Science News Letter, January 14, 1956

BIOCHEMISTRY

Find Extra Sugar Basis of Mutation

► DISCOVERY of a sugary difference in chemicals within the nucleus of virus mutants has won the \$1000 Newcomb Cleveland prize of the American Association for the Advancement of Science for Dr. Seymour S. Cohen of the University of Pennsylvania and Children's Hospital, Philadelphia.

The sugary difference comes from the addition of extra glucose to an acid in the virus nucleus. This seems to be the molecular basis of the mutational differences among viruses that prey on bacteria found in human intestinal tracts.

Discovery of the difference is, Dr. Cohen

said, the "first demonstration that DNA molecules of mutant organisms can be distinguished chemically."

The letters DNA stand for the acid in the virus nucleus which has the full name of deoxyribonucleic acid.

Virus DNA, Dr. Cohen and his group have found, contains a chemical not found in the nucleic acids of the host cells the viruses prey on. When a virus infects a host cell, it compels the conversion of a host cell chemical, cytosine, to the virus chemical 5-hydroxymethyl cytosine, which Dr. Cohen calls HMC for short.

As a result, the host cell has to switch its chemistry to production of virus. Sugar (glucose) derivatives of the virus HMC chemical control the dissolution of the host cell. Some virus mutants have two or more parts of glucose per HMC chemical while other virus mutants have only one part of glucose per HMC chemical. This is the sugary difference between the mutants.

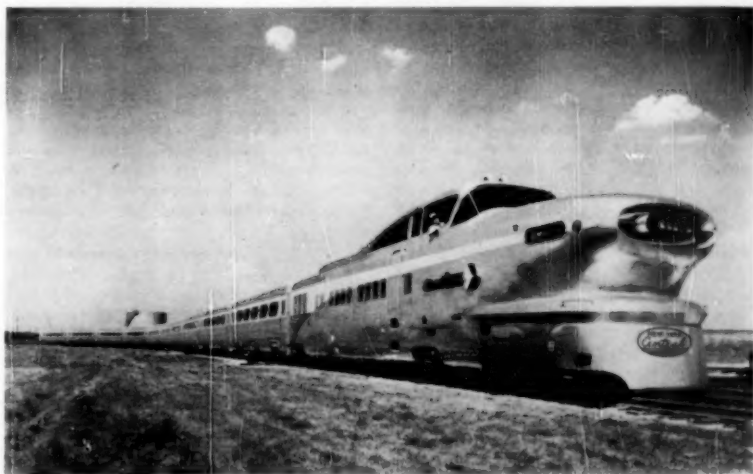
The importance of the HMC chemical was given by Dr. Cohen in the following statement:

"The mechanism of parasitism, the survival of the reproducing unit, and the basis of mutational difference in these bacterial viruses are all associated with the formation and structural relations of a single new pyrimidine base, 5-hydroxymethyl cytosine."

Science News Letter, January 14, 1956

Rheumatoid arthritis is a seasonal disease that is likely to begin or grow worse in the colder months.

Experts expect a winter wheat crop in 1956 of 735,000,000 bushels for the United States.



1956 TRAIN—This light-weight, fast train is the 1956 new look in rail transportation. The Aerotrain, as it is called, is built by Electromotive Division of General Motors and will go into regular service next spring. Using light-weight aluminum generously, it weighs only 1,000 pounds per passenger compared to the 2,500 in present equipment. It will cruise at about 100 miles per hour. Its low center of gravity makes the Aerotrain take curves at high speed without throwing passengers toward the outer side.

GENERAL SCIENCE

A.A.A.S. Council Votes on Avoiding Segregation

► THE COUNCIL of the American Association for the Advancement of Science, consisting of 328 members from sections and affiliated societies, is deciding by mail ballot whether to hold A.A.A.S. annual meetings in the future in any city where there is racial segregation.

The resolution presented at the Atlanta meeting, at which the mail action was ordered, provides that annual meetings be held where all members may freely meet for scientific discussions, the exchange of ideas and the exchange of established knowledge.

This, the resolution says, they must be able to do in formal meeting and informal social gatherings. These objectives cannot be fulfilled if free association is hindered by unnatural barriers, the resolution further declares. The resolution recites that no one is barred from election "because of race or creed."

Future A.A.A.S. meetings during Christmas-New Year's week are scheduled for: 1956, New York; 1957, Indianapolis; 1958, Washington, D. C.; 1959, Denver or Cleveland; 1960, Philadelphia; 1961, Chicago or St. Louis; 1962, Boston.

Science News Letter, January 14, 1956

MEDICINE

Link Weather With Polio-Like Disease

► DISCOVERY of a link between weather conditions and a polio-like disease was announced by Holbrook Landers, instructor in meteorology at Florida State University, Tallahassee, at the meeting of the American Association for the Advancement of Science in Atlanta.

Epidemic forecasting may be helped as a result, Mr. Landers thinks. At least it might be possible to tell a week or so in advance whether cases of such diseases would rise or fall off.

The epidemic of the polio-like disease hit Tallahassee in late summer and fall (1954). The curve of the epidemic and the curve of daily temperature range, relative humidity and minimum pressure were much the same. There was, however, about a 10-day lag between the high and low points in the weather curve and the high and low points of the epidemic.

This 10-day lag corresponded to the 10-day incubation period of the disease.

The peaks in the weather curve came when the daily temperature did not vary much, the relative humidity was high at noon and the pressure was lowest.

Such times, Mr. Landers theorizes, are the times when people are most uncomfortable because of the heat and humidity and consequently have least physical resistance.

A person being exposed to the germs of the polio-like disease every day, as

most everyone in Tallahassee was that summer, would be most likely, in Mr. Landers' opinion, to contract the disease when his physical resistance was lowest. The disease itself would develop 10 days later.

The onset of colder fall weather may, as has often been suggested for polio, have been instrumental in ending the epidemic.

The findings, Mr. Landers also thinks, may help identify the polio-like disease which hit Tallahassee and which has not yet been positively identified. The findings also give one more bit of positive evidence that various diseases and weather conditions are closely related.

Science News Letter, January 14, 1956

PSYCHOLOGY

Seeing Mutilated Man Affects Perception

► THE EMOTIONAL shock you feel when you see a person with only one arm or leg or otherwise severely mutilated, affects the way you perceive his appearance.

This was discovered when Drs. Warren J. Witteich and Keith B. Radcliffe Jr. had men look through distorting lenses in a study conducted at the Naval Medical Research Institute, Bethesda, Md.

The distorting lenses, known to scientists as anisoclinic lenses, make things look out of proportion and strange, somewhat as do the distorting mirrors at an amusement park.

The scientists had their subjects look through a series of distorting lenses of 14 degrees of distortion. The subjects reported at what point in the series the person looked at took on a bizarre appearance.

Sometimes the individual looked at was normal and sometimes he was made to appear mutilated by strapping one arm behind him and by pinning up one of his sleeves.

It took a much stronger lens to make the mutilated person appear distorted than was necessary to distort the appearance of the normal person.

Results of the study were reported in the *Journal of Abnormal and Social Psychology* (Nov.).

Science News Letter, January 14, 1956

PHYSICS

Rubber Head Used To Test Radiation Mask**See Front Cover**

► THE RUBBER head shown on the front cover of this week's SCIENCE NEWS LETTER was devised by the General Electric Company to test the face masks that protect workers at the Hanford plutonium plant from radioactive contamination.

The head "breathes" by use of multiple pumps. A filter inside the "windpipe" collects any radioactive particles that may penetrate the mask, thus testing its efficiency.

Science News Letter, January 14, 1956

IN SCIENCE

LANGUAGE

Heart Journal Adopts Interlingua Summaries

► THE OFFICIAL journal of the American Heart Association, *Circulation Research*, has joined the growing list of journals that append to every original article a summary in Interlingua, the international language that is an efficient and economical tool of international communication.

In announcing this 16th publication to use Interlingua, Dr. Alexander Gode, chief of SCIENCE SERVICE's Interlingua division, pointed out that Interlingua can be read by at least 95% of those who are technically qualified to read that same text in French, Spanish, German or English.

Interlingua is a regularized language that can be considered "standard average European." Scientific journals are using it to make the essence of their contributions accessible to readers unfamiliar with the language in which they are presented.

Science News Letter, January 14, 1956

METEOROLOGY

Glaciers Advancing In Northern Rockies

► FIFTY glaciers out of 73 recently measured in the Cascade and Olympic Mountains are advancing at present, Dr. Richard C. Hubley of the University of Washington reported.

Although 23 of 73 are not slowly edging forward, they are increasing in thickness, he told the American Meteorological Society meeting held in conjunction with the American Association for the Advancement of Science in Atlanta.

The glacier growth, he said, is a "radical change" that appears to have started about 12 years ago. During the previous 20 years, glaciers in this Rocky Mountain area were "without exception shrinking rapidly."

Dr. Hubley said an analysis of the area's weather records showed a trend toward cooler, wetter climate in western Washington. Mean annual temperatures have decreased one and a half degrees Fahrenheit during the last 10 years, he pointed out, while in the same period mean annual precipitation has increased 15 inches.

The great glaciers of Pleistocene times, about a million years ago, probably rose steeply to 10,000 or 15,000 feet on their southern sides and sloped gradually on the northern sides, Dr. William F. Tanner of Florida State University told the same meeting.

The ice sheet would have acted as a barrier to air movement just as the Himalayas now do, he said.

Science News Letter, January 14, 1956

THE FIELDS

HERPETOLOGY

Lizard Escape Artist Wiggles Out of Skin

► FOR WIGGLING OUT of a tight spot, nothing can beat the system of a little brown lizard from the Palau Islands in the Pacific. When you grab hold of the creature, he very literally runs out of his skin, leaving you very literally holding the bag.

Frederick M. Bayer, biologist with the Smithsonian Institution who reported on the slick trick of this gecko, *Peropus multatus*, did not discover whether these skinless lizards were able to survive and grow a new covering, or whether escape in this way was actually a suicidal act. He was unable to obtain reliable native reports as to whether such escaped lizards were ever seen again.

Science News Letter, January 14, 1956

MINING

Rock Chimes Foretell Mine Roof Cave-in

► EARTH can talk back to the mining safety engineer who checks the chances of a rock fall in mine or quarry, warning of failure of the rock roof by sounds ranging from pattering to creaking, or even the chime of bells.

Studies with an instrument that magnifies the inaudible sounds of very slight slips constantly occurring in the earth layers above the mine show that limestone particles make a pattering sound. Shale may sound like creaking timber. Basalt reminds the hearer of the deeper notes of doorbell chimes. Bell-like tones are heard when a layer of this kind of rock breaks.

Construction of the rock-testing instrument was inspired not by a mine inspector but by the vice president of the Liberty Mutual Insurance Co. of Boston, Mass., which has a large workman's compensation insurance program. The vice president, F. J. Crandell, who is an engineer, uses a pair of piezo-electric quartz crystals as a listening device.

Slipping of the rock layers near the probe which holds the pair of crystals sets up minute electric currents which are amplified by a battery-powered circuit. The inspector using the instrument listens for a period of about 15 minutes to get the characteristic noise rate of the mine. The noises are interpreted better by a human listener than by an automatic counting device, because noises made by the rocks can be selected and extraneous sounds ignored.

Prediction of the chance of the roof falling is possible if the observer knows the sounds usually made by the mine and the

rate at which rock slipping subsides to normal after a blast has been set off. Observations with the new instrument after the blast can be converted into a rate of failure curve from which the danger of cave-in can be determined.

Description of the new instrument is featured in the *Engineering and Mining Journal* (Dec. 1955).

Science News Letter, January 14, 1956

TOXICOLOGY

Men Eat DDT for Year Without Ill Effects

► FOR A FULL YEAR, 14 men voluntarily ate DDT, famous insecticide, to test its safety. Some of them ate every day 200 times the amount an average person gets from his diet through the residue left on fruits and vegetables sprayed with the insect killer.

The DDT came through this safety test with flying colors. During the entire test none of the volunteers complained of any symptoms or showed any sign of illness which did not have an easily recognized cause clearly unrelated to exposure to DDT.

The study was reported by Drs. Wayland J. Hayes Jr. and William F. Durham and Cipriano Cueto Jr. of the U. S. Public Health Service, Savannah, at the meeting of the American Association for the Advancement of Science in Atlanta.

DDT, as has been known for years, is stored in the body fat. The maximum storage is achieved in about one year apparently. After that no more is stored in spite of continued intake.

The scientists concluded that "there is a large safety factor associated with DDT as it now occurs in the general diet."

Science News Letter, January 14, 1956

HORTICULTURE

Mushroom Raising a \$20,000,000 Industry

► THE LOWLY mushroom provides the nation a \$15,000,000 to \$20,000,000 industry per year, furnishing some 80,000 people with a livelihood in growing, processing and marketing the fungus, the U. S. Department of Agriculture reports.

While some 60,000,000 to 70,000,000 pounds of mushrooms are grown each year in this country, use of a simple technique developed by Drs. T. T. Ayers and E. B. Lambert, scientists with the USDA, promises to increase yields and improve appearance of the crop.

The scientists have found that the addition of 100 parts of chlorine to 1,000,000 parts of the water used for spray irrigation of mushrooms effectively controls four common diseases that reduce yields and cause blotching and spotting of the crop. The chlorine does not discolor the mushrooms, imparts no flavor and leaves no toxic residue on the crop or in the soil, the researchers report.

Science News Letter, January 14, 1956

METALLURGY

Metal Failure Studies Speeded by Radiations

► CRACKING and failure of metal structures can be guarded against as the result of studies on imperfections in metal crystals reported to the American Association for the Advancement of Science by Dr. James H. Crawford Jr. of the Oak Ridge National Laboratory.

Using radiations from atomic reactors to bombard metallic crystals, Dr. Crawford has found the metal hardened, and the rate of changes taking place in the metal speeded up. Atoms knocked out of place during such bombardment also change the electrical properties of the transistor elements germanium and silicon. From these studies many fundamental properties of metals and other structural materials can be better understood and their term of useful life can be predicted with greater accuracy.

Science News Letter, January 14, 1956

GEOPHYSICS

Sensitive Instruments Observe Faint Airglow

► SPECIAL instruments that detect the upper atmosphere's very faint airglow even in full moonlight will scan the sky from at least four stations during the International Geophysical Year, an Air Force scientist said.

Dr. E. R. Manring of the Air Force Cambridge Research Center, Sunspot, New Mexico, said the studies were aimed at discovering what causes the peculiar glow, so faint it can be spotted only with special instruments.

Airglow is the word used to describe the self-luminescence of upper atmospheric gases. It is present every night everywhere on earth, but is of such low intensity it cannot be seen by the naked eye as auroras can.

A new device, first operated in 1955, should allow tracing one of the elements responsible for airglow even during daylight hours, Dr. Manring told a symposium on the International Geophysical Year.

The symposium was second of three held in Atlanta by the American Association for the Advancement of Science outlining plans for U. S. participation in IGY, a world-wide study of the earth, its seas and air scheduled for 1957-58.

Before the new instrument was developed, starlight and scattered sunlight interfered with the records scientists wanted to get. Now they can map the entire sky in less than four minutes, recording separately the light emitted by three of the elements thought to cause the airglow phenomenon.

The device is sufficiently sensitive to cut out all light except that from these three at night, but can catch light from only one element during day.

Science News Letter, January 14, 1956

PHYSICS

Franklin Was Prophet

Distinguished physicist and statesman, Franklin also predicted the role of science in the modern world. His 250th birthday anniversary celebrated all this year.

By HOWARD SIMONS

► BENJAMIN FRANKLIN, in addition to an eminent scientist, patriot and publisher, was also an accurate predictor of the role of science in the modern world.

This year, the world honors the 250th anniversary of the birth of this "versatile genius."

Much of the world that pays homage to Dr. Franklin this year was foreseen by him; for more than 175 years ago, Franklin predicted:

1. "We may perhaps learn to deprive large masses of their gravity, and give them absolute levity, for the sake of easy transport." (Today, countless numbers of airplanes travel aloft providing easy transportation.)

2. "Agriculture may diminish its labor and double its produce." (Today, farm labor has been lessened and production more than doubled.)

3. "All diseases may by sure means be prevented or cured, not excepting even that of old age, and our lives lengthened at pleasure even beyond the antediluvian standard." (Today, the life span lengthens each year and the toll of disease shortens.)

This is what Dr. Franklin foresaw as the result of the rapid progress of "true" science. So sure was he that mankind would reach these heights through scientific progress and technological advance that he lamented that perhaps he had been born too soon.

At the same time, Franklin foresaw man's slower pace in conquering his most dread disease, war. While outlining what the

world of today would be like, he expressed the fear that "moral" science was not progressing as rapidly. He wondered when "men would cease to be wolves to one another," and when "human beings would at length learn what they now improperly call humanity."

Benjamin Franklin was born on Jan. 17, 1706, and penned his predictions at the age of 74 to his English friend, the world-famous chemist, Joseph Priestly.

Most persons think of Benjamin Franklin as a statesman who only incidentally was interested in science. But most Franklin scholars agree that he was a scientist, who only incidentally was drawn into diplomacy.

Franklin spent the first 40 years of his life earning and saving enough money by printing and publishing to be able to retire and devote his time and energies to scientific investigation.

This he was able to do in 1748. He began his full-time scientific career with research in electricity, which had captured his imagination only a year earlier.

As I. Bernard Cohen, a Franklin scholar, tells us, "During the next five years, he made a series of remarkable contributions to the science of electricity, of which most of us remember only one—the demonstration of the electrical nature of lightning."

Hailed as the greatest electrical scientist of the world during his lifetime, Franklin discovered the principles of electricity and the nature of lightning.

He published a book entitled "Experiments and Observation on Electricity," in which he introduced in print words we still

use today in electricity, such as armature, condense, conductor, electrical shock, electricity and positive.

Dr. Franklin is credited with discovering the law of conservation of charge for conductors, the nature of electrostatic induction, the importance of grounding and insulation, and the fundamental properties of dielectrics.

His interest and experiments in electricity led to the celebrated electrical kite known by every schoolboy. Franklin also invented the lightning rod.

The late Dr. Robert A. Millikan, a Nobel Prize-winner in Physics, lists Benjamin Franklin as one of the two "most influential" scientists of the 18th century.

"Franklin," Dr. Millikan stated, "lives as a physicist because . . . it was he who with altogether amazing insight laid the real foundations on which the whole superstructure of electrical theory and interpretation has been erected."

But electricity alone was not the total extent of Franklin's scientific inquiries.

He was interested in meteorology, too. In 1743, he observed and recorded for the first time what we now take for granted, that northeast storms originate in the southwest, or in another way, that storms travel in an opposite direction to the winds and therefore their courses can be plotted.

Waterspouts and whirlwinds, he postu-



GEM Testing

By

B. W. ANDERSON

Director of the
Precious Stone
Laboratory, London
Chamber of Commerce

ILLUSTRATED

For gem collectors, dealers, jewelers, students, gem hunters, etc. Practical, clear, detailed, specific, and easy to use.

"How to identify jewels, to distinguish one stone from another and the genuine from imitations."—*Science News Letter*.

"An invaluable tool for all who have anything to do with precious stones."—*Jewellery Magazine*.

"All the tests that can be applied in gem classification and how and when to apply those tests."—*Watchmaker, Jeweler and Silversmith*.

"Splendid contribution to gemmological literature shows . . . just what are the easy scientific tests available for discriminating with certainty between one stone and another, and between real stones and their substitutes, and how to apply these tests in practice."—*British Jeweller*.

\$5.00 Postfree

5-Day Money-Back Guarantee

EMERSON BOOKS, Inc.

Dept. 671-K, 251 W. 19th St., New York 11

7 DENTAL INSTRUMENTS
PENCIL SHAPED TRUE TEMPERED TOOLS. These dental instruments made to sell for \$1.50 each are ideally suited for working in Metal, Plastic, Wood, Leather, Clay, Stone, etc. The pencil shape permits one to easily etch, carve, scribing, forming, modelling and untold number of uses. The quality of the tools is such that they will readily accept and hold re-shaping and sharpening. All 7 Instruments of various shapes
Only
\$1.98
Plus 20¢ PP

THREE 6" INSPECTION MIRRORS
Complete With Handles
Govt. Surplus. Permits inspection of parts or part numbers otherwise hidden from sight. Magnifies sizes up to 1" in diameter. A natural for mechanics, Radio & Television repairman, hobbyist. Made to sell for many, many times our **LOW PRICE** OF
\$1.69
For All Three Plus 15¢ PP

MATTHEW DAY CO. INC.
MONEY BACK GUARANTEE
DEPT. T-213

12 HONING STONES
Of Various Types — Sizes — Shapes
Govt. Surplus worth many times our low price. A various assortment of sizes, shapes and lengths for sharpening Tools, Instruments, Fish Hooks, Knives, Cutlery and hundreds of other uses. Also used for deburring, removing light scratches. Our assortment of shapes and lengths permits one to hone in hard to get places. Made to sell for up to 75¢ each. Our **LOW PRICE** for all 12 stones
\$1.98
Plus 25¢ PP

133 PIECE POWER TOOL ACCESSORY KIT
For: Sanding, Grinding, Polishing, Carving, Burnishing, Etching, Milling, Cleaning, Cutting Off, Hole Cleaning, Deburring, etc. Contains Grinding, Polishing, Cut Off and Buffing Wheels, Sanding Cartridges, and Discs, Steel Cutters, Mandrels, Burnisher, Mounted Stones, Knife Edge Rubbers, Wheels, etc. All with 3/32" Mandrels. The complete accessory set for any small job. Reg. \$8.00
OUR PRICE
\$1.98
Plus 25¢ PP

DUMONT, NEW JERSEY



COMMEMORATIVE—This stamp reproduces a Benjamin West painting.

DORMIPHONE

**YESTERDAY—SCIENCE FICTION
TODAY—ASTOUNDING
REALITY!**

FOR
• Foster Learning
• Memory Training
• Superb Listening
• Enjoyment

Today, for the first time, an ingenious device, The Dormiphone, invented by Max Sherover, president of Lingua-phone Institute, does for you what no machine has ever done before!

Would you like to increase your rate of learning 20% to 50% by making use of periods of relaxation and sleep? Scientists, actors, lecturers, students, psychologists prove DORMIPHONE can help you master a new language, improve your speech, memorize a role in a play, learn useful facts and figures with less time, less effort. All this in addition to more listening pleasure out of your favorite records makes the Dormiphone the most useful, 3-speed, portable phonograph ever assembled.



A Great
Scientific Discovery

FIND OUT ABOUT DORMIPHONE

Proof of what DORMIPHONE can do for you is fully set forth in a FREE Booklet, "A New Dimension in Learning." Write today. MODERNOPHONE, INC., Dormiphone Div., 125-016 Rock. Plaza, New York 20, N. Y.

MAIL COUPON NOW

MODERNOPHONE, INC. (Dormiphone Div.)
125-016 Rock. Plaza, N. Y. 20, N. Y.
Gentlemen: Please send me your FREE Booklet, "A New Dimension in Learning."

☐ If under 18 check for Special Booklet A.

Name.....

Address.....

City..... Zone..... State.....

My main interest is

☐ Learning a Language ☐ Speech Improvement
☐ Memorization ☐ Listening Enjoyment

lated, arise from the same origin and are similar, the big difference being that one travels over water and the other over land. Add to electricity and meteorology, Franklin's interest and work in aeronautics, agriculture, botany, medicine, horticulture, engineering, oceanography, and public health, and it is a good start in describing the scientific interest of America's most cherished scientist-statesman.

When today's scientists honor Benjamin Franklin, they do so in no greater degree than did the scientists of Franklin's own day.

Considered the first American scientist, Franklin gained world-wide recognition and did much to foster the interchange of ideas among the world's scientists.

He was a member of 24 scientific and educational societies in America, England, France, Scotland, Germany, Holland, Italy, Spain and Russia.

He was the founder and president of the American Philosophical Society, senior scientific society in America.

Dr. Franklin had a strong belief in one idea. This was that ideas themselves should be exchanged and that, through this exchange and communication, all mankind would benefit.

This year, more than 200 societies, associations, institutions, businesses, and public service units throughout the world will foster this idea and make it live.

The year-long homage will be offered by many of the world's leading scientists, authors, educators and statesmen to emphasize Franklin's dream of a much closer, cordial understanding between all the nations of the earth.

This will be part of the tribute paid to the man who, as Poor Richard, told mankind, "we may make these times better, if we bestir ourselves."

Science News Letter, January 14, 1956

NUTRITION

Hormone-Grown Meat Found Safe to Eat

► HORMONE-FED steer meat is safe to use, say scientists of the department of animal husbandry, Purdue University.

The scientists, led by T. W. Perry, came to this conclusion after performing assays on the meat from hormone-fed steers. The assays showed that no residual hormone was present in the meat.

The tests were conducted by the university scientists as part of a planned program of study to learn the effect of growth hormones on weight gain, sexual behavior, and carcass quality.

Steers on the 123-day test gained 50 to 52 pounds more than those not receiving hormone treatment. The carcasses were graded as slightly inferior when stillborned was the hormone fed.

Meat from steers fed hexestrol or dienes-trol was graded equal to the meat from the control steers that had received no hormone.

Science News Letter, January 14, 1956

To People Who Want to Write but can't get started

Do you have the constant urge to write but fear that a beginner hasn't a chance? Then listen to what a famous editor said on this subject:

"There is more room for newcomers in the writing field today than ever before. Some of the greatest of writing men and women have passed from the scene. Who will take their places? Fame, riches and the happiness of achievement await the new men and women of power."



NEIGHBORS PRAISE HIS ARTICLES

"As a 'buy-product' of my N.I.A. Training, I have received \$73.00 for articles from Auto-body and the Reconditioned Car. The local weekly printed one of my articles and asked for more. When neighbors stop you to say they read your piece, there's nothing like it."—George R. Maize, 114 9th St., Laurel Gardens, Pa.

Writing Aptitude Test FREE!

The Newspaper Institute of America offers a FREE Writing Aptitude Test. Its object is to discover new recruits for the army of men and women who add to their income by action and article writing.

The Writing Aptitude Test is a simple but expert analysis of your latent ability, your powers of imagination, logic, etc. Not all applicants pass this test. Those who do are qualified to take the famous N.I.A. course based on the practical training given by big metropolitan dailies.

This is the New York Copy Desk Method, which teaches you to write by writing! You develop your individual style instead of trying to copy that of others. Although you work at home, on your own time, you are constantly guided by experienced writers. You "cover" actual assignments such as metropolitan reporters get.

It is really fascinating work. Each week you see new progress. In a matter of months you can acquire the coveted "professional" touch. Then you are ready for market with greatly improved chances of making sales.

Mail the Coupon Now

But the first step is to take the FREE Writing Aptitude Test. It requires but a few minutes and costs nothing. So mail the coupon now. Make the first move towards the most enjoyable and profitable occupation—writing for publication! Newspaper Institute of America, One Park Avenue, New York 16, N. Y. (Founded 1925.) (Licensed by the State of New York.) (Approved Member National Home Study Council.)

Free

Newspaper Institute of America
One Park Avenue
New York 16, N. Y.

Send me, without cost or obligation, FREE Writing Aptitude Test and further information about Writing for profit.

Mrs. }
Miss }
Mr. }

Address.....

City..... Zone..... State.....

☐ Check here if Veteran.

(All correspondence confidential. No salesman will call on you.) **117-A-486**



Honorary
Vice President
of the world-famous
Globetrotters Club

By NORMAN D. FORD

DO you know there are thousands of Americans nowadays who travel far for only a few dollars a day, and they do what thousands of other Americans think only the rich can afford?

Do you know that living below the border is so cheap you can vacation for a month in a flower bedecked villa in Mexico with private swimming pool for what you'd spend in the U.S. in a week in an ordinary resort?

Do you know that for no more than you'd spend at such a resort, you can visit Cuba, Europe, or South America, or take your two or three weeks' vacation cruising through the West Indies? Or you can take a never-to-be-forgotten cruise to Rio or Buenos Aires or through the Canal to either coast or along the St. Lawrence River to French Canada and still spend no more than at a resort?

As founder of the Globetrotters Club, I have spent years searching for the many ways in which to travel on the least amount of money, the countries which are best to visit, and the ways in which to get the most for your money. I think I can tell you about exciting, low cost places both near at home and farther away, where you can spend unusual vacations at a cost you never dreamed possible. About the real "finds" travelers always get excited about if they should stumble upon such wonderful, lower cost places to stay and eat. About ways you probably never knew to cut transportation costs by using freighters, the lower cost foreign liners, and other forms of transportation.

Know what you can do on the money you've got. Look over the accompanying list of seven books bearing the imprint of Harian Pub-

WHERE DO YOU

lications... the publishing firm known throughout the world for publishing hard-to-learn facts about how to travel almost anywhere in the world as nearly on a shoestring as possible.

Some of them are my books—others are by other world travelers. Each one will show you how to see more of the world—and how do so without being rich.

STOP SAYING THAT TRAVEL IS TOO EXPENSIVE

Passenger carrying FREIGHTERS are the secret of low cost travel

FOR no more than you'd spend at a resort, you can take that trip you've always talked about: to the West Indies, Europe, the Mediterranean, around the world. In fact trips to almost everywhere are within your means.

And what accommodations you get: large rooms with beds (not bunks), probably a private bath, lots of good food and plenty of relaxation as you spend from port to port.

Depending upon how fast you want to go, a round-the-world cruise can be yours for as little as \$250-\$300 a month. And there are shorter trips. Fast, uncrowded voyages to England, France, the Mediterranean; two or three week vacations up and down the Pacific Coast or to New Orleans. Name the port and the chances are you can find it listed in *Travel Routes Around the World*, the world's original and most complete guide to passenger carrying freighters.

This is the book that names the lines, tells where they go, how much they charge, briefly describes accommodations. Hundreds of thousands of travelers all over the world swear by it. During the 20 years in which it's been published, hundreds of travel writers and travel editors have said "To learn how to travel for as little as you'd spend at a resort, get *Travel Routes Around the World*."

It's yours for just \$1, and the big 130 page 1956 edition includes practically every passenger carrying service starting from or going to New York, Canada, New Orleans, the Pacific Coast, Mexico, South America, England, France, the Mediterranean, Africa, the Indies, Australia, the South Seas, Japan, Hawaii, etc. There's a whole section called *How to See the World at Low Cost*, plus pages and pages of photos and maps.

A big \$1 worth, especially as it can open the way to more travel than you ever thought possible. For your copy, simply fill out coupon.

AIR TRAVEL CAN COST LESS

DO you know you can fly via a big DC-6 to the gay cities of Panama, with their nightclubs, and huge free port shopping bazaars, for only \$55?

If you know where to look for them, there are lower cost air services—scheduled, lower cost airlines to the most exciting countries of South America or to Scandinavia, as well as dozens upon dozens of other seldom-advertised opportunities to travel far for less than most people think air travel must cost.

Norman Ford's big guide *Air Routes of the World* tells you where the world's airlines go, their reliability, the planes used, the combination fares they offer, which services cost less, etc.

Page after page reveals the hidden extras in your air ticket. (Do you know how to fly to Europe and then to the cities and countries you want to see, yet spend less than many do for steamer across the ocean and rail in Europe?)

There's just as revealing information on how to cut your travel costs practically anywhere else in the world. (Do you know which are the recommended airlines to South America if you want to save money

on your fare? Which are the recommended airlines to the West Indies to see more, the best ways to reach Mexico? Do you know how to spend \$300-\$1250 less on a complete round the world air tour—how to take a longer air tour of the world for only \$82 a week?)

Do you know where to stay in the cities you'll visit (which are the comfortable, lower cost hotels recommended by Americans who've been there), how to schedule every day of your trip—whether it's to Europe, the West Indies, Mexico, South America—and whether you'll be gone 10 days, a month, or longer? Do you know what to do about excess baggage to avoid heavy additional costs; how to save many dollars on pay-later plans; when and how to use excursion fares to cut your travel costs still more?

In all the world, not another book tells you how to get more out of air travel, how to cut your costs, and have a trip you might not think today you can afford.

Prove to yourself that air travel can open the world to you, no matter how short a vacation you have. Send now for *Air Routes of the World*. It costs only \$1.50—which you can save many times over through just one hint.

ROUND THE WORLD ON A SHOESTRING

IF you know ALL the ways of reaching foreign countries, you don't need fantastic sums of money in order to travel. You could spend \$550-\$1000 on a one-way luxury steamer ticket to Buenos Aires, or you can get there for \$108 in fares via bus and rail through colorful Mexico, Panama, Colombia, Peru, the Andes, etc.

You could spend \$5000 on a luxury cruise around the world or \$700 via connecting steamers. You can island hop around the West Indies via plane for several hundred dollars—or see the islands more leisurely by motor schooner for much, much less. There's hardly a place on earth you can't reach for less if you know ALL the travel ways.

Norman Ford, founder of the Globetrotters Club and America's top expert on low-cost travel, has

gathered into one handy book dozens upon dozens of specific travel routings to all parts of the World—Mexico, South America, Europe, Africa and the Mediterranean, the Far East, Australia, the South Seas, etc.—so that you can see more at prices you can afford by combining freighter, liner, rail, bus, plane, and other competing services.

Over and over again he proves that you can travel now—that you don't have to wait for some far-off day when you've saved much more money.

\$1.50 brings you his big guide *How to Travel Without Being Rich*, the guide that proves now, once and for all that travel is within the reach of any one who has ever yearned to see far-away places. Send for your copy now.

WANT TO GO?

WHAT DO YOU WANT IN CALIFORNIA?

- A job or a business of your own?
- A vacation to Hollywood, San Francisco, Yosemite, elsewhere in California—
at a price you can afford?
- A place to retire on a small income?
- A home in the sun, with year-round spring-like days?

NO matter what you seek in California, William Redgrave's big book *California—the state that has everything* shows you city by city, town by town, road by road, everything you'll find in this big state.

If you are vacationing, his clear and detailed facts just about guarantee you won't miss anything worth seeing. And you will welcome his long lists of recommended restaurants, motels, and hotels where you can stop at the price you want to pay.

If you're looking for a job or a business of your own, *California—the state that has everything* gives you the facts you want. With William Redgrave's help you'll find the California that appeals to you—whole regions with just the degree of warmth and sunshine you want, with houses and rentals priced within your

means. If you're single, you'll find the best places to live for the fun and entertainment you want. If you're a family man, you'll find the best places to raise a family. If you want to retire, you'll find the pleasantest places in all California to live on a small income.

There's so much more to this book—the facts you need if you're thinking of living in a trailer, the best places to fish and hunt, where to go for a college education, what you'll pay in taxes, how best to find your own retirement or vacation paradise, etc., etc. There's so much information, in fact, that you probably wouldn't learn as much about California in months, even years, of traveling around this big state as you can learn from this one big book. Yet it costs only \$2. Mail coupon today for your copy.

WHERE THE DOLLAR BUYS SO MUCH MORE

DO you know where to find an island right near the U. S. as nearly like Tahiti in appearance, beauty, and color even the natives say it was made from a rainbow? (And that costs here are so low you can not only reach it but also stay a while for hardly more than you'd spend at a resort in the U. S.)

Do you know where to find the world's best mountain hideaways or its most dazzling surf-washed coastal resorts, where even today you can live for a song?

Do you know where it costs less to spend a while, the surroundings are pleasant, and the climate well-nigh perfect in such places as Mexico, the West Indies, Peru, France, along the Mediterranean, and in the world's other low-cost wonderlands?

Or if you've thought of more distant places, do you know which of the South Sea Islands are as undisputed today as in Conrad's day? Or which is the one spot world travelers call the most beautiful place on earth, where two can live in sheer luxury, with a retinue of servants for only \$175 a month?

Bargain Paradises of the World, a big new book with about 100 photos and 4 maps, proves that if you can afford a vacation in the U. S., the rest of the world is closer than you think. Authors Norman D. Ford and William Redgrave, honorary vice presidents of the Globetrotters Club, show that the American dollar is respected all over the world and buys a lot more than you'd give it credit for.

Yes, if you're planning to retire, this book shows that you can live for months on end in the world's wonderlands for hardly more than you'd spend for a few months at home. Or if you've dreamed of taking time out for a real rest, this book shows how you can afford it.

In any case, when it can cost as little as \$24.50 from the U. S. border to reach some of the World's Bargain Paradises, it's time you learned how much you can do on the money you've got. Send now for *Bargain Paradises of the World*. Price \$1.50. Use coupon to order.

Mail to HARIAN PUBLICATIONS, 104 First Ave. GREENLAWN (Long Island), New York

I have enclosed \$..... (cash, check, money order). Please send me the books checked below. **YOU WILL REFUND MY MONEY IF I AM NOT SATISFIED.**

- ☐ Travel routes around the world. \$1.
- ☐ Air routes of the world. \$1.50.
- ☐ How to travel without being rich (round the world on a shoestring). \$1.50.
- ☐ California—the state that has everything. \$2.
- ☐ Bargain paradises of the world (where the dollar buys so much more). \$1.50.
- ☐ Where to vacation on a shoestring (how to stop saying "I Always spend too much on my vacation"). \$1.
- ☐ Norman Ford's Florida. \$2.

Special Offers: } Any \$6 worth of books for \$5
 } Any \$9 worth of books for \$7.50
 } All books above—\$10.50 value—for \$8.50

Print Name.....
 Address.....
 City & State.....

Where Will You Go in Florida?

If You Want a Vacation You Can Afford?

FLORIDA needn't be expensive—not if you know just where to go for whatever you seek in Florida. And if there's any man who can give you the facts you want it's Norman Ford, founder of the world-famous Globetrotters Club. (Yes, Florida is his home whenever he isn't traveling!)

His big book, *Norman Ford's Florida*, tells you, first of all, road by road, mile by mile, everything you'll find in Florida, whether you're on vacation, or looking over job, business, real estate, or retirement prospects.

Always, he names the hotels, motels, and restaurants where you can stop for the best accommodations and meals at the price you want to pay. For that longer vacation, if you let Norman Ford guide you, you'll find a real "paradise"—just the spot which has everything you want.

Of course, there's much more to this big book.

If you want a job or a home in Florida, Norman Ford tells you just where to head. If you want to retire on a small income, Norman Ford tells you where life in Florida is pleasantest on a small income.

Yes, no matter what you seek in Florida—whether you want to retire, vacation, get a job, buy a home, or start a business, *Norman Ford's Florida* gives you the facts you need to find exactly what you want. Yet this big book with plenty of maps and well over 100,000 words sells for only \$2—only a fraction of the money you'd spend needlessly if you went to Florida blind.

For your copy, fill out coupon now.

How to Stop Saying

"I always spend too much on my vacation"

IN his new book, *Where to Vacation on a Shoestring*, Norman Ford, founder of the world-famous Globetrotters Club, tells you about hundreds of undiscovered beauty spots all over America, Canada, Mexico, and elsewhere, where you'll have the time of your life and spend less money.

He tells you how to get real values in whatever kind of vacation you want, whether it's a weekend at a beach or two weeks in the mountains or an auto tour of America.

He tells you all about the national parks and how to reach them with double the sightseeing. He shows where to get the real bargain basement in government supported vacation resorts. He has the data you want whether you vacation on a real western ranch, or cruise on a houseboat into the Minnesota woods or on a sailing ship along the Maine coast, or if you want to do any of the hundreds of things the American vacationist can do—if he knows where to find out about such exciting ways to vacation and how to do them with the least expenditure of money.

Whatever your plans might be—to tour the magnificent Colorado Rockies or relax at a luxury hotel where rates tumble to a third of their high season level or to sightsee for a week in New York or Los Angeles or New Orleans—no matter what are your plans, in Norman Ford's big book, you'll find the facts you want on what to do before leaving, where to find low cost accommodations, what to see, and how to cut your costs. Yes, he covers rail and plane vacations, too.

There are close to 75,000 words in *Where to Vacation on a Shoestring*, and a book as big as this for only \$1 is a real value. When you think of how it will give you a fuller, happier, and lower cost vacation, you'll say it's one of the best investments you ever made. Use coupon to order.

Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ALLOY SERIES IN PHYSICAL METALLURGY—Morton C. Smith—*Harper*, 338 p., illus., \$6.00. A companion volume to the author's Principles of Physical Metallurgy with which it can be used for professional reference.

THE AMERICAN DRUG INDEX—Charles O. Wilson and Tony Everett Jones—*Lippincott*, 576 p., \$5.00. Listing in alphabetical order generic, brand, and chemical names of drugs for use by physicians, nurses, and students.

CHEMICAL ENGINEERING: Volume Two, Unit Operations—J. M. Coulson and J. F. Richardson—*McGraw-Hill*, 975 p., illus., \$9.00. Concerned mainly with the physical nature of the processes that take place in industrial units.

DWELLERS IN DARKNESS: An Introduction to the Study of Termites—S. H. Skaife—*Longmans Green*, 134 p., illus., \$5.00. Termites live in the oldest type of community on the face of the globe, the author tells us, they can survive only when crowded together in dense throngs, and their society is a ruthless totalitarianism in nature.

INTRODUCTION TO DEMOGRAPHY—Mortimer Spiegelman—*Society of Actuaries*, 309 p., \$6.00. A textbook on the study of population.

LUCRETIVS' DE RERUM NATURA: The Roman Poet of Science—Set in English verse by Alban Dewes Winspear—S. A. Russell, *The Harbor Press*, 299 p., \$5.00. Lucretius was the poet of scientific method and he wanted his thinking to be understandable to the common man.

MAN AND THE WINDS—E. Aubert De La Rue, translated by Madge E. Thompson—*Philosophical Library*, 206 p., illus., \$6.00. Including scientific information and mythology, the effects of wind as well as its usefulness to man.

A MARINER'S METEOROLOGY—Charles Graham Halpine and Halton Hagen Taylor—*Van Nostrand*, 371 p., illus., \$8.00. A practical book in simple terms and photographs for those who depend on the water for fun or livelihood.

MEN, ROCKETS AND SPACE RATS—Lloyd Mallan—*Messner*, 335 p., illus., \$5.95. Telling the human story of some of our aeronautical pioneers.

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY: Volume 3, Power Reactors—*United Nations (Columbia University Press)*, 389 p., illus., \$7.50. A complete summary of the status of reactor technology throughout the whole world.

Science News Letter, January 14, 1956

RONALD Books . . .

200 MILES UP

J. GORDON VAETH

Head, New Weapons and Systems Division
U. S. Navy Special Devices Center

NEW! The complete, fascinating story of upper air research climaxed by the current preparations for launching the first artificial earth satellite. The author supplements his own eye-witness accounts with graphic illustrations of the new vehicles and techniques, and instrumentation of high altitude flight. Book tells the story of the Skyhook Balloon, the White Sands' experiments, the Aerobee and Viking Rockets, and the powerful multiple stage rocket which will launch the earth satellite. Covers launching procedures, methods of tracking and controlling rocket flight, recording data, etc. 2nd Ed. 77 illus.; 261 pp. \$5.

PHYSICS TELLS WHY

OVERTON LUHR, Union College

Explaining common phenomena in clear, simple terms, this helpful book covers the field of physics from surface tensions to buoyancy, from light and heat to weather and air conditioning, from electricity to music. It discusses the basic principles of radio, radar, television, jet-propulsion, atomic energy, etc. A minimum of mathematics is used. "... non-formidability (and) scientific rigor combine to make this a fine book." RAY W. SUCHY, Milwaukee State Teachers College. 195 illus.; 387 pp. Rev. Ed. \$3.75.

PRACTICAL TAXIDERMY

JOHN W. MOYER

Chicago Natural History Museum

This complete working guide provides latest methods for mounting fish, bird, mammal, and reptile specimens. Contains step-by-step instructions, detailed drawings, photographs, plus a history of taxidermy. "Beautifully illustrated guide . . . of use to museum preparators and amateurs alike." ALFRED M. BAILEY, Director, Denver Museum of Natural History. 101 illus.; 126 pp. \$3.

WAYS OF MAMMALS

—in Fact and Fancy

CLIFFORD B. MOORE

Formerly Forest Park Museum,
Springfield, Massachusetts

A delightful book describing the fascinating, often misunderstood habits of mammals—from domestic to jungle beasts. Includes several sections by authorities on particular aspects of animal behavior. "One of the most needed books ever published in the field." PERCY A. MORRIS, Peabody Museum of Natural History, Yale University. 273 pp. \$3.50.

Send for these books. (We pay postage when check accompanies order.)

THE RONALD PRESS COMPANY

15 E. 26th Street • New York 10

TOOLS

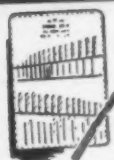
SURPLUS DRILL BARGAINS

41 SURPLUS TWIST DRILLS



\$2

For hand or electric drills. Brand new genuine hardened carbon tool steel drills from 1/16" through 1/4". Each drill designed and tempered to give up to 1800 drillings through steel, aluminum, iron, wood, plastic. Sells in the stores for up to \$6. Set of 41 drills \$2.



29 Pc. Vanadium Chrome DRILL SET

Specially made for speed drilling in sturdy indexed container. Finest alloy steel drills, hardened and precision ground to the sharpest, longest lasting cutting edge obtainable; will easily and cleanly bite through hardwoods, plastics, aluminum, iron and the toughest steels. Unconditionally guaranteed for thousands of drillings Full jobber-length. Sizes by 64ths from 1/16" to 1/2". There are only a limited quantity of sets available at this low price, so hurry!

NOW \$6.95 plus 50c handling-postage.
Also available with Turned Down Shanks \$8.95
to fit all 1/4" drills
In individual pocket tool roll, postpaid



60 Pc. Set Vanadium CHROME Wire Gauge DRILLS

Top quality high test Chrome Vanadium Drills designed for speed drilling through toughest steels, woods, plastic, iron and aluminum. Precision ground long-lasting cutting edges. Guaranteed to give years of satisfaction. A full 60 pc. set Nos. 1 thru 60. A \$14.95 value now only \$5.35 plus 25c pp. and hdlg.

Same set above available with Huot Metal Index Container only \$6.35 plus 25c pp. and hdlg.

HOW TO ORDER

Send check or money order with name and address. We pay postage if C.O.D. you pay postage and C.O.D. charges. Money back guarantee pro- fects you fully. Rush orders today.

SCOTT- MITCHELL HOUSE, INC.
Dept. 2401
611 Broadway
New York 12, N. Y.

LINGUAPHONE

MAKES IT EASY TO LISTEN AND LEARN to

Speak

SPANISH • FRENCH • ITALIAN GERMAN • RUSSIAN • JAPANESE MODERN GREEK—34 languages available

Only LINGUAPHONE, The World's Standard Conversational Method, brings the world's best native language teacher into your home. For just 20 Minutes a Day you listen to Linguaphone's MODERN Recordings. They make it easy—AND FUN—to learn another language AT HOME—the same natural way you learned to speak English long before you went to school.

You Listen, You Understand, You SPEAK. It's like living in a foreign land. You hear 8 to 12 native men and women converse about everyday matters. You acquire a true accent no TEXTBOOK CAN TEACH.

Exciting Business, Travel Opportunities here and abroad. The Linguaphone Method is used 'round the world by schools, colleges, governments, large business firms. Over 1,000,000 home study students.

Stop Wishing—Start Talking! WRITE FOR FREE BOOK. Linguaphone Institute, 31-010 Rock Plaza, New York 26, N. Y.

Questions

DENTISTRY—What part of saliva has anti-carries action? p. 20.

□ □ □

GENERAL SCIENCE—How does science serve mankind? p. 19.

□ □ □

GEOPHYSICS—How fast does the earth's interior turn over? p. 23.

□ □ □

MEDICINE—Against what kind of cold virus does the new vaccine protect? p. 20.

□ □ □

PHYSICS—How can the hydrogen bomb fusion be controlled without a container. p. 22.
How constant is a second? p. 21.

□ □ □

Photographs: Cover, General Electric; p. 19, Wayne Taylor; p. 21, Westinghouse; p. 23, J. Walter Thompson.

WASHINGTON SCHOOL COLLECTION

This collection has been popular for years in High Schools. It includes 20 of the most important and common Rocks and also 20 common minerals. Each of the 40 specimens is about 2" in size and imbedded in cotton in a strong partitioned box size 10 1/2 x 16 1/2 x 1 1/2". A set of unlabeled small specimens for quiz and identification purposes is included without extra charge. Price \$8.50 prepaid. Booklet, Introduction to Geology for the Layman 50¢.

New Catalogue in May #1

ECKERT

MINERAL RESEARCH
PROSPECTORS SUPPLIES

Dept. SNL
110 EAST MAIN STREET
FLORENCE, COLORADO

100x Area Magnifying Projector



—Enlarges Pictures, Printing, & Objects!
—Full Color! Readable!
NEW! Electric Magna-Vue Optical Instrument projects & enlarges clippings, pictures, sketches, objects in full natural color, correctly & readable. Project on wall, screen or table. **MAGNIFIES 100 AREAS.** Enlarges any material up to 3 1/2 x 4 in. to 32 x 40 in. For home, school, class, business, shop use. Also make signs, sketches easy from any copy. Enamelled steel, 10 x 7 1/2 in. high. Quality 2" focusing lens. Standard 110 volt current. Money back guarantee. (2 for \$9.50) Each postpaid, \$4.98

Johnson Smith Co., Dept. 281, Detroit 7, Mich.
New CATALOG of 3000 NOVELTIES



Tricks, jokes, funmakers, hobbies, magic, gadgets, sports, cameras, jewelry, auto & bike items, science articles, office & house gadgets, books, seeds, games, music, etc. Catalog 10¢. Johnson Smith Company, Dept. 281, Detroit 7, Mich.

OPTICAL BARGAINS



Photographers!

Adapt your camera to this Scope for excellent Telephoto shots and fascinating photos of moon!

... See the Stars, Moon, Planets Close Up!

BUILD A BIG 100 POWER 3" REFLECTING TELESCOPE

... with this Complete 87 Piece "Do-it-yourself" Kit
EXCELLENT SCIENCE CLUB PROJECT!

Get Ready to See the Artificial Satellites!

Everything you need! No machining! Easily assembled! We furnish complete, simple instructions. Kit includes: 3" f/10 aluminized and over-coated Spherical Mirror—60X Eyepiece and 100X Barlow Lens—Cross-line Finder—sturdy 40" Tripod—fork type Equatorial Mount with locks on both axes—ventilated 3" Mirror Mount—heavy wall, black Telescope Tube. All nuts and bolts supplied. Nothing extra to buy. Our 3" Spherical Mirror (30" f.l.) is guaranteed to resolve detail right up to theoretical limit. Your finished scope can also be used terrestrially. Money-back guarantee. Shipping weight, 10 lbs.

Stock No. 85,025-Q \$29.50 f.o.b. Barrington, N. J.

SPITZ JR. PLANETARIUM



LATEST MODEL! One of the Greatest Scientific Toys We Have Ever Offered! Projects nearly 400 stars, more than 70 constellations in their correct relationships. Use it in any darkened room of the house, project it on the ceiling. No batteries, works on ordinary household current. Rheostat control for brightness.

32-page book included free of extra cost. Contains valuable information about the stars, provides easy identification of the constellations. About 14" high on a 7" x 7" base. Projection sphere 7" diameter. Illuminated Point-Stock No. 70,040-Q \$14.95 Postpaid

SKY ZOO PROJECTOR fits above planetarium. Projects the outlines of mythological figures. Stock No. 70,050-Q \$3.98 Postpaid

50-150-300 Power MICROSCOPE

Low Price Yet Suitable for Classroom Use! Only \$14.95

3 Achromatic Objective Lenses on Revolving Turret!

Imported! The color-corrected, cemented achromatic lenses in the objectives give you far superior results to the single lenses found in the microscopes selling for \$9.95! Results are worth the difference! Fine rack and pinion focusing. Stock No. 70,008-Q \$14.95 Postpaid



POCKET MICROSCOPE

Adjustable 20, 40, 60 POWER!

A compact, imported, handy precision instrument of many uses. Select power you want, then focus sharply by turning special micro-focus ring. Good quality optics. Full satisfaction guaranteed. Stock No. 30,005-Q Only \$3.95 Postpaid

"MAKE-YOUR-OWN" 4 1/2" MIRROR KIT—Polished and aluminized mirror, lenses for eyepiece and diagonal. No metal parts. Stock No. 50,074-Q \$16.25 Postpaid

INSTRUCTION BOOKLETS

Easy to follow—accurate—8 1/2 x 11 page size—many illustrations. Do-it-yourself—Save! and have Fun!

	Stock No.	Price
How to Build Projectors.....	9014-Q	45¢
Homebuilt Telescopes.....	9006-Q	30¢
Method to Clean Precision Optics.....	9024-Q	15¢
Homebuilt Riflescopes.....	9018-Q	40¢
NEW—JUST ISSUED		
How to Condense and Project Light with Lenses.....	9044-Q	75¢
Reticles and Their Uses.....	9038-Q	45¢
ULTRA CLOSE-UP Photography.....	9042-Q	60¢
Infrared Light and Its Uses.....	9040-Q	75¢
Homemade Stereo-Adapters.....	9032-Q	30¢
Homemade Stereo-Viewers.....	9034-Q	30¢
Photo Micrography with Pen Microscope.....	9029-Q	10¢
Dummy Cameras.....	9035-Q	20¢
Collimating Systems.....	9041-Q	35¢
"Building a Condenser Enlarger".....	9038-Q	40¢

"ALL ABOUT TELEPHOTO LENSES" 21 pages—wealth of information—diagrammed instructions. Tells how to build Telephoto attachments—how to use them. Lots of other good dope on Telephotography. Stock #9038-Q 80¢ Postpaid.

Order by stock No. Send Check or M.O. Satisfaction Guaranteed!

EDMUND SCIENTIFIC CORP., BARRINGTON, N. J.

SPITZ JR. MOONSCOPE

See Earth's Largest Satellite

A precision-made 32 power reflecting telescope—by the makers of Spitz Planetarium. Clearly reveals the craters of the moon, shows Saturn, Jupiter, other wonders of the heavens. Based on same principles as world's giant telescopes. Stands 36" high on removable legs. Adjustable 3" polished and corrected mirror. Fork type Alt-Azimuth rotates on full 360° circle—swings to any location in the sky. Fascinating 28-page instruction book is included. Instrument packed in sturdy carrying case.



Stock No. 70,068-Q \$14.95 Postpaid

SPECIAL SALE 7x50 MONOCULAR

This is fine quality, American made instrument—war surplus! Actually 7 1/2 of U.S. Govt. 7 x 50 Binoocular. Imported! No larger than a pocket watch. Brand new, \$95 value. Due to Japanese competition we close these out at a bargain price.

Stock No. 50,009-Q \$15.00 Postpaid

New! 2 in 1 Combination!
Pocket-Size
50 POWER MICROSCOPE
and
10 POWER TELESCOPE
ONLY
\$4.50
ppd.



Useful Telescope and Microscope combined in one amazing, precision instrument. Imported! No larger than a fountain pen. Telescope is 10 Power. Microscope magnifies 50 Times. Sharp focus at any range. Handy for sports, looking at small objects, just plain snooping. Send Check or M.O. Satisfaction Guaranteed

Order Stock No. 30,059-Q \$4.50

SIMPLE LENS KITS!

Fun for adults! Fun for children! Kits include plainly written, illustrated booklet showing how you can build lots of optical items.

Stock No. 2-Q—10 lenses..... \$ 1.00 Postpaid
Stock No. 5-Q—45 lenses..... \$ 5.00 Postpaid
Stock No. 10-Q—80 lenses..... \$10.00 Postpaid

GET FREE CATALOG #Q—World's largest variety of Optical Items. Bargains galore... War Surplus—Imported—Domestic Microscopes, Telescopes, Hand Spectroscopes, Prisms, Lenses, Reticles, Mirrors and dozens of other hard-to-get Optical Items. Ask for FREE CATALOG #Q.

• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 813. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

✿ **TOY TELEPHONE** for hard playing youngsters is unbreakable. Molded of polyethylene plastic, finger smudges, jam and other foods can be wiped off or washed clean with soap and water. The dial spins around and rings softly as a spring spins it back.

Science News Letter, January 14, 1956

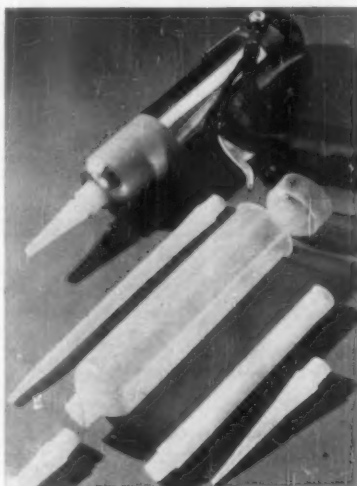
✿ **ATOMIC CHART** for offices and laboratories is printed on a combination of fiber and plastic that makes it washable. The periodic chart will not curl, flake or fray. All atomic weights are corrected to conform with the 1952 international committee values.

Science News Letter, January 14, 1956

✿ **SHOE INSOLES** made of vinyl resins promise longer wear and better absorption of perspiration without cracking. A layer of the porous material is sandwiched between two layers of latex-impregnated backing. This is split in half to form a right and left porous insole.

Science News Letter, January 14, 1956

✿ **SEALANT GUN** designed to speed sealing operations uses throw-away cartridges and nozzles made of polyethylene plastic,



as shown in photograph. The threaded nozzles screw into the cartridge. After use, they can be discarded to save cleaning time and costs. The gun is small, light, and effective at close-quarters work.

Science News Letter, January 14, 1956

✿ **SET SCREW** is headless and self-locking, particularly adapted to soft metals. The top of the screw is spread slightly and takes up the "flow" of the soft metal, causing the locking action. It can be removed and re-used.

Science News Letter, January 14, 1956

✿ **DRILL POINT GAUGE** for the do-it-yourself craftsman enables anyone to measure chisel point, point angle and clearance angle. Made of stainless steel, the gauge is in the form of two semi-circular discs held together at the center.

Science News Letter, January 14, 1956

✿ **GARDEN FENCE** for the home owner is a heavy gauge steel, covered with white plastic and electro welded into prefabricated units. The packaged fencing, available in either high or low sizes, does not scratch, break, rust or discolor.

Science News Letter, January 14, 1956

✿ **FIRE SAFETY SKYLIGHT** is made of fiber glass reinforced, translucent structural panels. It is designed to give automatic and immediate ventilation in case of fire. The fire opening mechanism consists of an aluminum enclosed spring unit with a stainless steel rod.

Science News Letter, January 14, 1956

A FEW MEMBERSHIPS ARE NOW AVAILABLE

in *Things* of science for 1956

A WONDERFUL GIFT . . . ANY TIME OF YEAR

ONCE A MONTH for a year we will pack a blue package with scientific fun, with mental stimulation, with hours of absorption, with future hobbies, with knowledge; but specifically we will pack the boxes with **THINGS** of science—real objects of science to be handled and looked at and owned. And with them, sheets of suggested experiments and complete explanations of them. There are now more than ten thousand members of the group of friends of science who receive one of these exciting boxes each month. This unusual service comes one year postpaid for \$5.00. (Add \$1 for additional postage on outside U.S.A. addresses.) Use this coupon to send in your gift memberships NOW.

Send **THINGS** of science for one year to the names and addresses on the attached sheets.

- ☐ Renew my own subscription for one year.
- ☐ Payment enclosed. ☐ Bill me.
- ☐ Send gift card in my name as imprinted at the left.

1-14-6

Do You Know?

The production of milk per cow in Russia annually is about half that in the United States.

It is estimated that the leaf surface of a 12-year-old apple tree may be equal to about one-tenth of an acre.

A person standing on one leg imposes on the corresponding hip joint a weight two and a half times his body weight.

Non-whites in the United States comprised 12.1% of the population in 1900; in 1955, they were 10.8%.

Information that every kind of cell has its own peculiar chemical needs makes it evident that chemicals which cure mouse cancer will not necessarily cure human cancer.

The 1955 tobacco crop in North America declined about 10,000,000 pounds as compared with 1954.

The reliable starting ability of a gas turbine in cold weather is a reason for the engine's increasing use.